

IT-401 F

## DATA WAREHOUSING AND DATA MINING

L T P  
3 1 -

Class Work: 50

Exam: 100

Total: 150

Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

### Section A

Data warehousing Definition, usage and trends. DBMS vs data warehouse, Data marts, Metadata, Multidimensional data mode, Data cubes, Schemas for Multidimensional Database: stars, snowflakes and fact constellations.

Data warehouse process & architecture, OLTP vs OLAP, ROLAP vs MOLAP, types of OLAP, servers, 3-Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.

### Section B

Data warehouse implementation, computation of data cubes, modelling OLAP data, OLAP queries manager, data warehouse back end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse.

Data mining definition & task, KDD versus data mining, data mining techniques, tools and applications.

### Section C

Data mining query languages, data specification, specifying knowledge, hierarchy specification, pattern presentation & visualisation specification, data mining languages and standardisation of data mining.

Data mining techniques: Association rules, Clustering techniques, Decision tree knowledge discovery through Neural Networks & Genetic Algorithm, Rough Sets, Support Vector Machines and Fuzzy techniques.

### Section D

Mining complex data objects, Spatial databases, Multimedia databases, Time series and Sequence data mining Text Databases and mining Word Wide Web.

### Text Books:

1. Data Warehousing In the Real World; Sam Anahory & Dennis Murray, 1997, Pearson
2. Data Mining- Concepts & Techniques; Jiawei Han & Micheline Kamber- 2001, Morgan Kaufmann.
3. Data Mining Techniques; Arun Pujar; 2001, University Press; Hyderabad.

### Reference Books:

1. Data Mining; Pieter Adriaans & Dolf Zantinge; 1997, Pearson,
2. Data Warehousing, Data Mining and OLTP; Alex Berson, 1997, Mc Graw Hill.
3. Data warehousing System; Mallach; 2000, Mc Graw Hill.
4. Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
5. Developing the Data Warehouses; W.H Ionhman,C.Klelly, John Wiley & Sons.
6. Managing the Data Warehouses; W.H.Inman, C.L.Gassey, John Wiley & Sons. .

**CSE-403 F SOFTWARE PROJECT MANAGEMENT**

L T P  
3 1 -

Class Work: 50  
Exam: 100  
Total: 150

Duration of Exam: 3Hrs.

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**Section A**

**Introduction to Software Project Management (SPM):** Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.

**Stepwise Project planning:** Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

**Section B**

**Project Evaluation & Estimation:** Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods, rapid application development, water fall-, V-process-, spiral-models. Prototyping, delivery. Albrecht function point analysis.

**Activity planning & Risk Management:** Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of lagged activities, adding the time dimension, backward and forward pass, identifying critical path, activity throat, shortening project, precedence networks.

**Section C**

**Risk Management:** Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values..

**Resource allocation & Monitoring the control:** Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.

**Monitoring the control:** Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.

**Managing contracts and people:** Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises..

**Section D**

**Software quality:** Introduction, the place of software quality in project planning, the importance of software quality, defining software quality, ISO 9126, Practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality.

**Study of Any Software Project Management software:** viz Project 2000 or equivalent

**Text Book:**

1. Software Project Management (2<sup>nd</sup> Edition), by Bob Hughes and Mike Cotterell, 1999, TMH

**Reference**

**Books:**

1. Software Engineering – A Practitioner’s approach, Roger S. Pressman (5<sup>th</sup> edi), 2001, MGH
2. Software Project Management, Walker Royce, 1998, Addison Wesley.
3. Project Management 2/c. Maylor
4. Managing Global software Projects, Ramesh, 2001, TMH.
5. Software Project Management, Bharat Bhusan Agarwal, Shivangi Dhall, University Science Press

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#### Section A

Introduction to Systems and Network Administration: The Scope of Systems and Network Administration, The Goals of Systems and Network Administration, System Components and their Management: Operating Systems: Windows and Unix Variants, File Systems and Standards (UFS, NFS, NTFS), Processes and Job Control, Privileged, User and Group Accounts, Logs and Audits, Systems Performance Tuning:

#### Section B

Host Management: Booting and Shutting down of an Operating System, Formatting, Partitioning and Building a File System, File System Layout, Concept of swap space, Cloning Systems, OS Installation, Installation and configuration of devices and drivers, Software Installation and Structuring Software, Open Source Software: The GNU Project, Superuser/Administrator Privileges, User Management, Adding/Removing users, Controlling User Resources, Disk Space Allocation and quotas, Process Management and Monitoring, Scheduling Processes, Killing/Stopping processes, Restarting a Process, Monitoring Process Activity, Maintaining Log Files, File System Repair, Backup and Restoration, , Handling Man Pages/Help System, Kernel Customization, Integrating Multiple Operating Systems, System Sharing, User IDs, Passwords and Authentication.

#### Section C

Network Administration: Introduction to Network Administration Approaches, Addressing and Subnetting : Fixed Vs Variable Masks, VLAN Principles and Configuration, Routing Concepts, Static and Dynamic Routing, Routing Protocols: RIP, OSPF, BGP, Network Address Translation (NAT), Configuring a Linux/Windows Box as a Router, Dial-up configuration and Authentication: PPP, Radius, RAS, Configuring a DNS Server, Configuring Sendmail Service, Configuring a Web Server, Configuring a Proxy Server, TCP/IP Troubleshooting: ping, traceroute, ifconfig, netstat, ipconfig, Network Management.

#### Section D

Host and Network Security :Security Planning, Categories of Security: C1, C2, C3, C4, Password Security, Access Control and Monitoring: Wrappers, Firewalls: Filtering Rules, Detection and Prevention of Denial of Service (DOS) Attacks, Automatic Identification of Configuration Loop Holes, Security Information Resources: CERT, Installing and Upgrading System Software, Use of Scripting tools: Shell Scripting, Perl/Python Scripting, Use of Make Option  
Security Planning, Categories of Security: C1, C2, C3, C4, password security, Access Control and Monitoring.

#### BOOKS RECOMMENDED

1. "Principles of Network and System Administration", Mark Burgess, 2000, John Wiley and Sons Ltd,
2. "TCP/IP Network Administration" (3<sup>rd</sup> Edition), Craig Hunt, O'Reilly and Associates Inc., 2002.
3. "Windows 2000 Administration", George Splading, 2000, McGraw-Hill.
4. "Linux Network Administrator's Guide", Olaf Kirch and Terry Dawson, (2<sup>nd</sup> Edition), O'Reilly and Associates Inc., 2000, (Shroff Publishers and Distributors, Calcutta),
5. Software Requirements : Microsoft Windows 2000, Linux, Perl/Python

IT-407 F

WEB ENGINEERING

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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section A**

**Information Architecture:** The role of the Information Architect, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites and Intranets, Creating Cohesive Organization Systems Designing Navigation Systems, Types of Navigation systems, Integrated Navigation Elements, Remote Navigation Elements, Designing Elegant Navigation Systems, Searching Systems, Searching your Web Site, Designing the Search Interface, Indexing the Right Stuff, To search or Not To Search, Grouping Content, Conceptual Design, High-Level Architecture Blueprints, Architectural Page Mockups, Design Sketches.

**Section B**

**Dynamic HTML and Web Designing:** HTML Basic Concepts, Good Web Design, Process of Web Publishing, Phases of Web Site development, Structure of HTML documents, HTML Elements-Core attributes, Language attributes, Core Events, Block Level Events, Text Level Events, Linking Basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image maps, Semantic Linking Meta Information, Image Preliminaries, Image Download Issues, Image as Buttons, Introduction to Layout: Backgrounds, Colors and Text, Fonts, Layout with Tables. Advanced Layout: Frames and Layers, HTML and other media types. Audio Support in Browsers, Video Support, Other binary Formats. Style Sheets, Positioning with Style sheets. Basic Interactivity and HTML: FORMS, Form Control, New and emerging Form elements.

**Section C**

**Java Server Pages and Active Server Pages:** Basics, Integrating Script, JSP/ASP Objects and Components, configuring and troubleshooting.: Request and response objects, Retrieving the contents of a an HTML form, Retrieving a Query String, Cookies, Creating and Reading Cookies. Using application Objects and Events.

**Section D**

**Overview of advance features of XML**

**Text Books:**

- 1 HTML The complete Reference, TMH
- 2 CGI Programming with Perl 2/e, Scott Guelich, Shishir Gundavaram, Gunther Birzniek; O'Reilly
- 3 Doug Tidwell, James Snell, Pavel Kulchenko; Programming Web Services with SOAP, O' Reilly
- 4 Pardi, XML in Action, Web Technology, PHI

**CSE-409-F****ADVANCED JAVA**

L T P  
3 1 0

Class Work : 50  
Exam. : 100  
Total : 150  
Duration of Exam. : 3 hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section A****CORE JAVA**

Introduction to Java, Data types, variables, operators, Arrays, Control Statements, Classes & Methods, Inheritance, Exception Handling, Multithreading, Collections, I/O streams, AVVT & Aplet Programming.

**NETWORKING**

Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming

**Section B****DATABASE NETWORKING**

The Design of JDBC. The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Metadata, Row Sets, Transactions, Advanced Connection Management, Introduction of LDAP

**DISTRIBUTED OBJECTS**

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods Server Object Activation, Java IDL and CCRA, Remote Method Calls with SOAP

**Section C****SWING**

Lists, Trees, Tables, Styled Text Components, Progress Indicators, Component Organizers

**AWT**

The Rendering Pipeline, Shapes, Areas, Strokes, Paint, Coordinate Transformations, Clipping, Transparency and Composition, Rendering Hints, Readers and Writers for Images, Image Manipulation, Printing. The Clipboard, Drag and Drop

**Section D****JAVABEANS COMPONENTS**

Beans, The Bean-Writing Process, Using Beans to Build an Application, Naming Patterns for Bean Components and Events Bean Property Tubes Beaninfo Classes Property Editors Customizes

**SECURITY**

Class Loaders, Bytecode Verification, Security Managers and Permissions, Digital Signatures, Code Signing, Encryption

**TEXT BOOK:**

Core Java™ 2, Volume II-Advanced Features, 7<sup>th</sup> Edition by Cay Horstmann, Gary Cornell Pearson Publisher, 2004

**REFERENCE BOOKS:**

1. Professional Java Programming by Brett Spell, WROX Publication
2. Advanced Java 2 Platform, How to Program, 2<sup>nd</sup> Edition, Harvey. M. Dietal, Prentice Hall
3. Advanced Java, Gajendra Gupta, Firewall Media

**CSE-415-F**

**ADVANCED JAVA LAB.**

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Class Work: 50

Exam: 100

Total: 150

Duration of exam: 3 hrs.

**Development of programs relating to :**

1. JDBC
2. Servlets
3. Beans
4. RMI
5. JSP

**IT 409-F****SYSTEM AND NETWORK ADMINISTRATION LAB.**

L      T      P  
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Class Work:    25  
Exam:            50  
Total:            75  
Duration of exam: 3 hrs.

1.      Management of the users & the domain.
2.      Configuring DHCP.
3.      Setting up the local security policy.
4.      Start and stop services from user window and command prompt.
5.      Use of event viewer.
6.      Use of the performance monitor.
7.      Management of the IIS and FJP server.
8.      Setting up of local area network.
9.      Setting up of router in Window 2000 server.
10.     Use of utilities    (a) Ping (b) Trocert      (c) netstat      (d) net    (e) IP configuration      (f)  
Path ping
11.     Use of network monitor.
12.     Setting up of a DNS.
13.     Setting up and use “Terminal Clinet Services”.

**IT-411 F**

**WEB ENGINEERING LAB.**

L	T	P
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Class Work:	25
Exam:	50
Total:	75
Duration of Exam:	3 Hrs.

Practical based on theory contents.

## IT-471 F MANAGEMENT INFORMATION SYSTEM

L T P  
3 1 -

Class Work : 50  
Exam : 100  
Total : 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions**

### Section A

**Foundation of Information System:** Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, MIS organization within company, Management information and the systems approach.

**Information Technology:** A manager's overview, managerial overviews, computer hardware & software, DBMS, RDBMS and Telecommunication.

### Section B

**Conceptual system design :** Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, prepare the conceptual design report.

### Section C

**Detailed system design :** Inform and involve the organization, aim of detailed design, project management of MIS detailed design , identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, document the detailed design revisit the manager user.

### Section D

**Implementation evaluation and maintenance of the MIS:** Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development .

**Advanced Concepts in Information Systems :** Enterprise Resources Management(ERP), Supply Chain Management, C R M , Procurement Management System.

### Text Books:

- Management Information System by W. S. Jawadekar, 2002, Tata McGraw Hill.
- Information System for Modern Management (3rd edition)- Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI

### Reference books:

- Management Information System; O Brian; TMH
- Management Information System by Davis Olson Mac Graw Hill
- Management Information System by Staslings,(Maxwell Mc Millman Publishers)
- Information System; a Management Perspective; Alter Addison Wesley
- Introduction to Information System; McGraw Hill

IT-421 F

EMBEDDED SYSTEMS DESIGN

L T P  
3 1 -

Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

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**Section A**

Real time operating system overview, exposure to Windows CE, QNX, Micro kernels and Pc/OS of introduction to process models. Interrupt routines in an RTOs environment, encapsulating semaphores and queues, hard real-time scheduling considerations, saving memory space.

**Section B**

16 & 32 bit microprocessor and micro-controller and DSP hardware with reference to Embedded system.

**Section C**

Embedded software development tools and compilers – host and target machines, linker/ locators for embedded software, cross compilers, cross assemblers and tool chains, gcc compiler, basic concept of device drivers, serial communication interface device driver.

**Section D**

System synthesis of Hardware/ software co-emulation, simulation speed of emulators. JTAG OCD  
Communication protocols with special reference to embedded system. TCP/IP, VDP wireless protocols, IRDA, Blue tooth IEEE 8.8.11.

**Text Books:**

1. An embedded system primer by David E Simon, 1999, Addison-Wesley
2. Programming for Embedded system by Dreamtech software team, John wiley, 2002

**Reference Books:**

1. TCP/IP Lean: Web servers for embedded systems by Jeremy Bentham, 2002
2. Real –time programming: A guide to 32 bit embedded development, Rick Grehan, 1999, AW.

**IT-405- F****INTRODUCTION TO E-COMMERCE & ERP**

L	T	P
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Class Work: 50

Exam: 100

Total: 150

Duration of Exam: 3 Hrs.

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**Section A**

**Introduction and Concepts:** Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions.

**Electronic Payment Methods:** Updating traditional transactions; Secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks. Security protocols.

**Section B**

**Electronic Commerce Providers:** On-line Commerce options: Company profiles. Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model. On-line Commerce Environments: Servers and commercial environments; Ecommerce servers.

**Digital Currencies:** Operational process of Digicash, Ecash Trail; Using Ecash; Smart cards; Electronic Data Interchange: basics, EDI versus Internet and EDI over Internet. Strategies, Techniques and Tools, Shopping techniques and online selling techniques.

**Section C**

**ERP- An Enterprise Perspective:** Production Finance, Personnel disciplines and their relationship, Transiting environment, MIS Integration for disciplines, Information/Workflow, Network Structure, Client Server Integrator System, Virtual Enterprise.

**ERP – Resource Management Perspective:** Functional and Process of Resource. Management, Introduction to basic Modules of ERP System: HRD, Personnel Management, Training and Development, Skill Inventory, Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management in global scenario.

**Section D**

**ERP - Information System perspective:** Introduction to OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR., SCM, REP, CRM, Information Communication Technology.

**ERP-Key Managerial issues:** Concept Selling, IT Infrastructure, Implication, of ERP Systems on Business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, Resistance to change, ERP Selection issues, Return on Investment, Pre and Post Implementation Issues.

**Text Book:**

1. “Frontiers of electronics Commerce” Ravi lalakota, Andrew Whinston ,1996, Addison Wesley,
2. Enterprise Resource Planning-Concepts and Practice, V.K. Garg and N.K. Venkita Krishna, 1998, PHI.

**Reference****Books:**

1. The SAP/3 Handbook, John Antonio, Fernandez, TMH.
2. “The E-Business Revolution” Denial amor Addison Wesley
3. “From Edi to E-Commerce: A Business Initiative” Sokol TMH
4. “E Commerce” Greenstein and Feinman TMH
5. ”E Commerce” Excel, Diwan, Sharma
6. Asset International “Net Commerce” TMH
7. “E Commerce: The Cutting Edge of Business” Bajan And Nag TMH
8. E-Commerces- Jaffrey F. Rayport , Bernard J. Jaworski, 2002, T.M.H
9. Electronic Commerce – Security , Risk management and Control , Greenstein, Feinman, 2002, T.M.H

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#### Section A

**Introduction:** Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues, Communication in distributed system: Layered protocols, ATM networks, Client – Server model, Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems.

#### Section B

**Synchronization in Distributed System:** Clock synchronization, Mutual exclusion, Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock Detection.

**Processes and Processors in distributed systems:** Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems.

#### Section C

**Distributed file systems:** Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems.

**Distributed Shared Memory:** What is shared memory, Consistency models, Page based distributed shared memory, shared variables distributed shared memory.

#### Section D

**Case study MACH:** Introduction to MACH, process management in MACH, communication in MACH, UNIX emulation in MACH.

#### Text Book:

1. Distributed Operating System – Andrew S. Tanenbaum, PHI.
2. Operating System Concepts , P.S.Gill, Firewall Media

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#### Section A

**Introduction:** Codes and Ciphers – Some Classical systems – Statistical theory of cipher systems- Complexity theory of crypto systems – Stream ciphers, Block ciphers.

**Stream Ciphers:** Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined encryption and encoding. Block Ciphers – DES and variant, modes of use of DES.

#### Section B

Public key systems – Knacksack systems – RSK – Diffie Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems.

**System Identification and clustering:** Cryptology of speech signals – narrow band and wide band systems – Analogue & Digital Systems of speech encryption.

#### Section C

**Security: Hash function – Authentication:** Protocols – Digital Signature standards. Electronics Mail Security – PGP (Pretty Good Privacy) MIME, data Compression technique. IP Security: Architecture, Authentication Leader, Encapsulating security Payload – Key Management. Web security: Secure Socket Layer & Transport Layer security, Secure electronics transactions. Firewalls Design principle, established systems.

#### Section D

Telecommunication Network Architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model, SNMP v1, SNMP2 & SNMP3, RMON1 & 2, Broadband Network Management (ATM, HFC, DSL), ASN

#### Text Books:

1. Cryptography and Network Security: Principal & Practices, 2<sup>nd</sup> Edition by Upper Saddle River, PHI
2. Network Management Principles & Practices by Subramanian, Mani (AWL)
3. SNMP, Stalling, Willian (AWL)

#### Reference Books:

1. SNMP: A Guide to Network Management (MGH)
2. Telecom Network Management by H.H. Wang (MGH)
3. Network Management by U. Dlack (MGH)

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#### Section A

**Introduction and Fundamental to Digital Image Processing:** What is Digital Image Processing, Origin of Digital Image Processing, Examples that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing System, Image sensing and acquisition, Image sampling, quantization and representation, Basic relationship between pixels.

**Image Enhancement in the Spatial Domain & Frequency domain:** Background, Basic gray level transformation, Histogram processing, Basics of spatial filtering, Smoothing and Sharpening Spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform. Smoothing and Sharpening Frequency-Domain filters.

#### Section B

**Image Restoration:** Image Degradation/Restoration Process, Noise models, Restoration in presence of noise, Inverse Filtering, Minimum Mean Square Filtering, Geometric mean filter, Geometric transformations.

**Color Image Processing:** Color Fundamentals, Color models, Basis of full color image processing, Color transformations.

#### Section C

**Image Compression:** Fundamentals, Image compression models, Error free compression, Lossy compression.

**Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

#### Section D

**Representation, Description and Recognition:** Representation-chain codes, polygonal approximation and skeletons, Boundary descriptors-simple descriptors, shape numbers, Regional descriptors-simple, topological descriptors, Pattern and Pattern classes-Recognition based on matching techniques.

**Recognition:** Pattern and pattern Classes, Decision-Theoretic Methods.

#### Text Book:

Digital Image Processing by Rafael C.Gonzalez & Richard E. Woods –2002, Pearson Education

#### Reference Book:

Digital Image Processing by A.K. Jain, 1995,-PHI

Digital Image Processing by Abhishek Yadav, Poonam Yadav, University Science Press

Digital Image Processing by Dr. Shashi Kumar Singh, University Science Press

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#### Unit I

**Data Models:** EER model and relationship to the OO model, Object Oriented Databases, Overview of concepts, object identity, object structure, type constructors, encapsulation of operations, methods and persistence, type hierarchies and inheritance, complex objects, overview of Object model of ODMG, object Relational databases, Databases design for an ORDBMS, Nested relational Model, storage and access method.

**Query Optimisation:** Query Execution Algorithms, Heuristics in Query Execution, Cost Estimation in Query Execution, Semantic Query Optimisation.

#### Unit II

**Database Transactions and Recovery Procedures:** Transaction Processing Concepts, Transaction and System Concepts, Desirable Properties of a Transaction, Schedules and Recoverability, Serializability of Schedules, Transaction Support in SQL, Recovery Techniques, Database Backup, Concurrency control, locking techniques for Concurrency Control, Concurrency Control Techniques, Granularity of Data Items.

**Client Server Computing:** Client Server Concepts, 2-Tier and 3-Tier Client Server Systems, Client/Server Architecture and the Internet, Client /Database Server Models, Technology Components of Client Server Systems, Application Development in Client Server Systems.

#### Unit III

**Distributed and Parallel Databases:** Reliability and Commit protocols, Fragmentation and Distribution, View Integration, Distributed database design, Distributed algorithms for data management, Heterogeneous and Federated Database Systems. Parallel database Architectures and their merits and demerits.

**Deductive and Web Databases:** Recursive Queries, Prolog/Datalog Notation, Basic inference Mechanism for Logic Programs, Deductive Database Systems, Deductive Object Oriented Database Systems; Web or Internet Databases: Introduction, uses, Building blocks of Web, tools, advantages and disadvantages.

#### Unit IV

**Emerging Databases:** Multimedia database: Definition, need of Multimedia databases, MDBMS, Multimedia database components and structure, Multimedia database queries and applications; Mobile database: definition, their need, Characteristics, architecture, uses and limitations of mobile databases; Digital libraries: Introduction, Objectives, types, components, myths, services, advantages, limitations, and comparison with traditional libraries; Spatial databases: Basic concepts, need, types and relationships, architecture, queries, indexing techniques, advantages and disadvantages of spatial databases; Temporal database: basic concepts, characteristics, components, merits and demerits,

#### Text Book:

- 1 Fundamentals of Database Systems (3 edition), Elmasri R. and Navathe S.B., 2000, Addison Wesley, Low Priced Edition.

#### Reference Book:

- 1 Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.

L T P  
3 1 -

Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

#### Section A

Introductions & overview of HCI:

History of computer user interfaces, HCI - history and intellectual root

#### **Human information processing limitations, human decision making.**

Human cognitive and sensory limits, Human memory

Human problem solving, Skill acquisition

Users' conceptual models (mental models)

Decision making, Computer systems and user interfaces, human-system interaction:

Input and output devices, Mechanics of particular devices, Speech input, sound and speech output,

Computer architecture, Performance characteristics of humans and systems, Color issues, Computer graphics, Color representation, color maps, color range of devices

#### Section B

Interaction models and metaphors:

Use of abstract metaphors for describing interface behavior, Use of metaphors to support user understanding, Dialog input and output techniques and purposes, Screen layout issues, Dialog interaction: types and techniques, navigation and orientation, multimedia and non-graphical dialogues, Dialog issues: response time, control, standards, look and feel, Layers model of architecture of design and windowing systems, Windows manager models, e.g., X, Macintosh, MS Windows, Hypermedia and WWW

Principles guiding well-designed human-system interaction:

Paradigms for interaction, Principles to support usability, Accounting for users with disabilities

#### Section C

The design process – overview:

The typical software development lifecycle (idealized vs. actual), User-centered design overview, “Three pillars of design”, Usability engineering overview, Reconciling UCD and usability testing

The design process - task and user needs analysis:

Task analysis definition, Techniques for task analysis, Sources of information

The design process – making use of task and user data for system design.

Use cases, scenarios, Structuring the information, Information architecture, User and process flows, Wireframes, Mockups, comps, Other methods of conveying structure and function

#### Section D

Designing for universal access:

What is accessibility? What is accessible software, Examples of accessibility adaptations, What's driving software accessibility, Implications for software organizations

Speech user interfaces:

Attributes of speech user interfaces, Evaluating speech user interface quality

HCI in mission-critical and high-risk environments:

Safety implications of human-computer interaction, Effects of automation, Addressing the effects

#### **Text books:**

1. Hackos, J.T. & Redish, J.C. (1998). User and task analysis for interface design. John New York: Wiley & Sons.
2. Norman, D. (1988). The design of everyday things. New York: Basic Books.

#### **Reference Books:**

1. Designing the User Interface: Strategy for Effective Human Computer Interaction, 3<sup>rd</sup> edition, Bel Shneiderman, Perason Edu. Publ. 2000
2. Human Computer Interaction Dix, A et al. Prentice Hall 1993
3. Graphical User Interface Design and Evaluation Redmond-Pyle, D. & Moore, A. Prentice Hall 1995
4. The Art of Human-Computer Interface Design Laurel, B Addison-Wesley 1990

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#### Section A

**Fundamentals and Testing types:** First, second and later cycles of testing. Objectives and limits of testing. Overview of S/W development stages, Planning and Design stages and testing during these stages. Glass box code, Regression and Black box testing, Software errors, Categories of software error.

**Reporting and analyzing bugs:** Problem reports, Content and Characteristics of Problem Report, analysis and Tactics for analyzing a reproducible bug. Making a bug reproducible

#### Section B

**Problem Tracking System:** Objective of Problem Tracking System, tasks of the system, Problem tracking overview, users of the tracking system, mechanics of the database

**Test Case Design:** Characteristics of a good test, equivalence classes and boundary values, visible state transitions, Race conditions and other time dependencies, load testing. Error guessing, Function equivalence testing, Regression Testing, General issues in configuration testing, printer testing

#### Section C

**Localization and User Manuals testing:** Translated text expands, Character sets, Keyboards, Text filters, Loading, saving, importing, and exporting high and low ASCII, Operating system Language, Hot keys, Error message identifiers, Hyphenation rules, Spelling rules, Sorting Rules, Uppercase and Lowercase conversion, Printers, Sizes of paper, CPU's and video, Rodents, Data formats and setup options, Rulers and measurements, Culture-bound Graphics and output, European product compatibility, Memory availability, automated testing, Testing User Manuals, Effective documentation, documentation tester's objective, How testing documentation contributes to software reliability

#### Section D

**Testing Tools and Test Planning:** Fundamental tools, Automated acceptance and regression tests, standards, Translucent box testing Overall objective of the test plan: product or tool? Detailed objective, type of test, strategy for developing components of test planning documents, components of test planning documents, documenting test materials

S/W Development tradeoffs and models, Quality-related costs, The development time line, Product design, alpha, Pre-beta, Beta, User Interface freeze, Pre-final, Final integrity testing, Project post-mortems, Legal consequences of defective software, Managing and role of a testing group, independent test agencies

#### Text Book:

1. Testing Computer Software, by Cem Kaner, Jack Falk, Hung Quoc Nguyen, 1999, Pub: Wiley, (Second Edition).

**IT-469 F**

**LOGIC & FUNCTIONAL PROGRAMMING**

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Class Work:    50  
Exam            :    100  
Total            :    150  
Duration of Exam: 3 Hrs.

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**Section A**

Procedural and non-procedural lang., prolog vs LISP, Applications of LISP & PROLOG in designing expert system. Syntax of PROLOG, Lists, Operators, Arithmetic, Structures, Controlling Back Tracking.

**Section B**

Input and Output, built-in predicates, Operation on Data Structures, Advanced Tree Representation.

**Section C**

Prolog in Artificial Intelligence: writing programs for search techniques, Constraint logic programming, Knowledge representation and expert system, Expert System Shell.

**Section D**

Planning, Machine Learning, Inductive Logic Programming, Qualitative Reasoning, Language Processing, Game Playing, Meta Programming.

**Text Book:**

1. Prolog Programming for Artificial Intelligence by Ivan Bratko, 2001, Pearson Edu.

**Reference Books:**

1. Symbolic Computing with Lisp & PROLOG - by Mueller, JW, 1998
2. Programming in turbo PROLOG by Lee Teft - PHL.

CSE-437 F

NATURAL LANGUAGE PROCESSING

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Class Work: 50

Exam: 100

Total: 150

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**Section A**

Components of natural language processing: lexicography, syntax, semantics, pragmatics: word level representation of natural languages prosody & natural languages.

Formal languages and grammars: chomsky hierarchy, Left-Associative grammars, ambiguous grammars, resolution of ambiguities.

**Section B**

Computation linguistics: recognition and parsing of natural language structures: ATN & RTN, General techniques of parsing: CKY, Earley & Tomita algorithm.

**Section C**

Semantics-knowledge representation semantic networks logic and inference pragmatics, graph models and optimization, prolog for natural language semantic.

**Section D**

Application of NLP: intelligent work processors: Machine translation, user interfaces, Man- Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP.

**Text Book:**

1 "Natural Language Understanding" James Allen ,Benjamin-1995, cummings Pub. Comp. Ltd.,

**Reference Books:**

1. "Language as a cognitive process", Terry Winograd 1983, AW
2. "Natural Language processing in prolog" G. Gazder, 1989, Addison Wesley.
3. " Introduction of Formal Language Theory, Mdlj Arbib & Kfaury, 1988, Springer Verlag

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#### Section A

**Introduction:** Review of the Traditional Methodologies, Advantages of Object Oriented Methodologies over Traditional Methodologies, Classes, Objects, Encapsulation, Association, Aggregation, Inheritance, Polymorphism, States and Transitions.

**Visual Modelling using Unified Modelling Language (UML):** What is Visual Modelling? ObjectOriented Modelling, Introduction to Unified Modelling Language (UML): History of UML, Overview of UML – Capabilities, Usage of UML. Introduction to Rational Rose CASE tool: Introduction – Importance of Rational Rose, Capabilities of Rational Rose Case Tool.

#### Section B

**Introduction to Objectory Software Development Process:** Introduction, Benefits, Phases and Iterations, Elaboration Stage, Construction Stage, Transition Stage.

**Creating Use Case Diagrams:** Actors and Use Cases, Use Case Relationships, Types of Relationships, Use Case Diagrams: Creating Main Use Case -, Relationships - , Additional Use Case - Diagrams in Rational Rose, Activity Diagrams Activities, Transitions, Decision Points, Swimlanes

**Identifying Classes ,Packages and drawing a Class Diagram:** State, Behaviour, Identity of Objects, Stereotypes and Classes, Creating and Documenting Classes in rational Rose, Packages, Drawing a Class Diagram Specifying Relationships : The Need of Defining Relationships, Association and Aggregation Relationships, Naming Relationships, Role Names, Multiplicity Indicators, Reflexive Relationships, Package Relationships, Inheritance, Finding Relationships, Creating Relationships in Rational Rose

#### Section C

**Discovering Object Interactions:** Documenting Scenarios using Interaction Diagrams, Types of Interaction Diagrams, Adding Behaviour and Structure: Representing Behaviour and Structure, Creating Attributes & operations and documenting them, Displaying attributes and operations, Association Classes, Analysing Object Behaviour: Modelling Dynamic Behaviour, States

#### Section D

**Checking the Model:** Making the Model Homogeneous, Combining Classes, Splitting Classes, Eliminating Classes, Consistency Checking, Scenario Walk-through, Event Tracing, Documentation Review, Designing the System Architecture : The need for Architecture, The “4+1” view of Architecture, The Logical view, The Component View, The Process View, The Deployment View, The Use Case view.

**The Iteration Planning Process:** Benefits, Goals, Design the User Interface, Adding Design Classes, The Emergence of Patterns, Designing Relationships, Designing Attributes and Operations, Designing for Inheritance, Coding, Testing, and Documenting the Iteration.

#### Text Books:

1. “UML User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, 2000, Addison Wesley.
2. Visual Modeling with Rational Rose 2000 and UML By Terry Quatrani Foreword by Grady Booch, 2000

#### Reference Books:

1. “UML Reference Guide”, James Rumbaugh, Ivar Jacobson, Grady Booch, 2000, Addison Wesley.
2. “The Objectory Software Development Process”, Ivar Jacobson, Grady Booch, James Rumbaugh, 1999, Addison Wesley.
3. 1999, Addison Wesley.
4. UML Distilled by Maxtin Fowler with Kendall Scott, 2000 ,Second Edition
5. Sams Teach Yourself “UML” In 24 Hours By Joseph Schmuller ,2000

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#### UNIT 1

**Gigabit Ethernet** → Overview of fast Ethernet, Gigabit Ethernet – overview, specifications, layered protocol architecture, network design using Gigabit Ethernet, applications, 10GB Ethernet – overview, layered protocol architecture, applications.

**Wireless Networks** → Existing and emerging standards, Wireless LAN(802.11), Broadband Wireless(802.16), Bluetooth(802.15) their layered protocol architecture and security. Mobile Networks – GSM, CDMA and GPRS

#### UNIT 2

**Fibre Channel** → Fibre channel physical characteristics – topologies & ports, layered protocol architecture, class of service, technology comparison, SAN overview and architecture.

**Frame Relay** → Protocol architecture, frame format, routing, congestion control.

#### UNIT 3

**ISDN & B-ISDN** → ISDN - Channels, interfaces, addressing, protocol architecture, services and B-ISDN

**ATM** → Virtual circuits, cell switching, reference model, traffic management.

#### UNIT 4

**Internet Layer** → IPV4 and IPV6, IP addressing, ARP, IP routing(OSPF & BGP), internet multicasting, mobile IP.

**Transport Layer** → UDP/TCP protocols & architecture, TCP connection management, wireless TCP.

**Application Layer** → DNS, FTP, Voice over IP, audio & video compression.

#### Reference & Text Books:

1. James P.G. Sterbenz and Joseph D. Touch, High-Speed Networking: A Systematic Approach to High-Bandwidth Low Latency Communication, Wiley, 2001
2. [William Stallings](#), High-Speed Networks TCP/IP and ATM Design Principles, Prentice Hall; 1st edition, 1998.